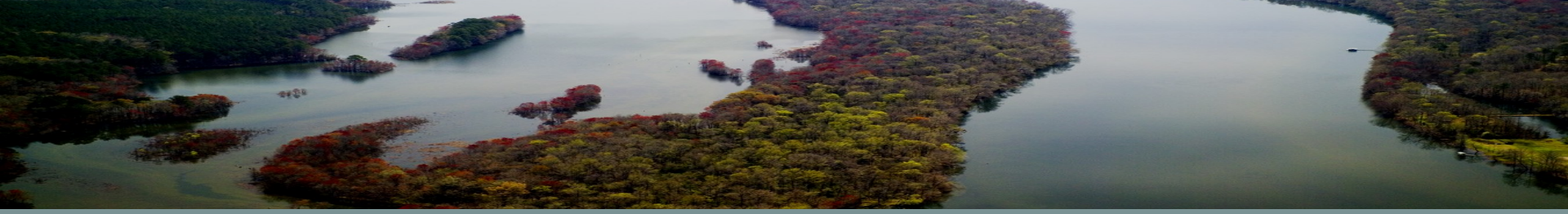
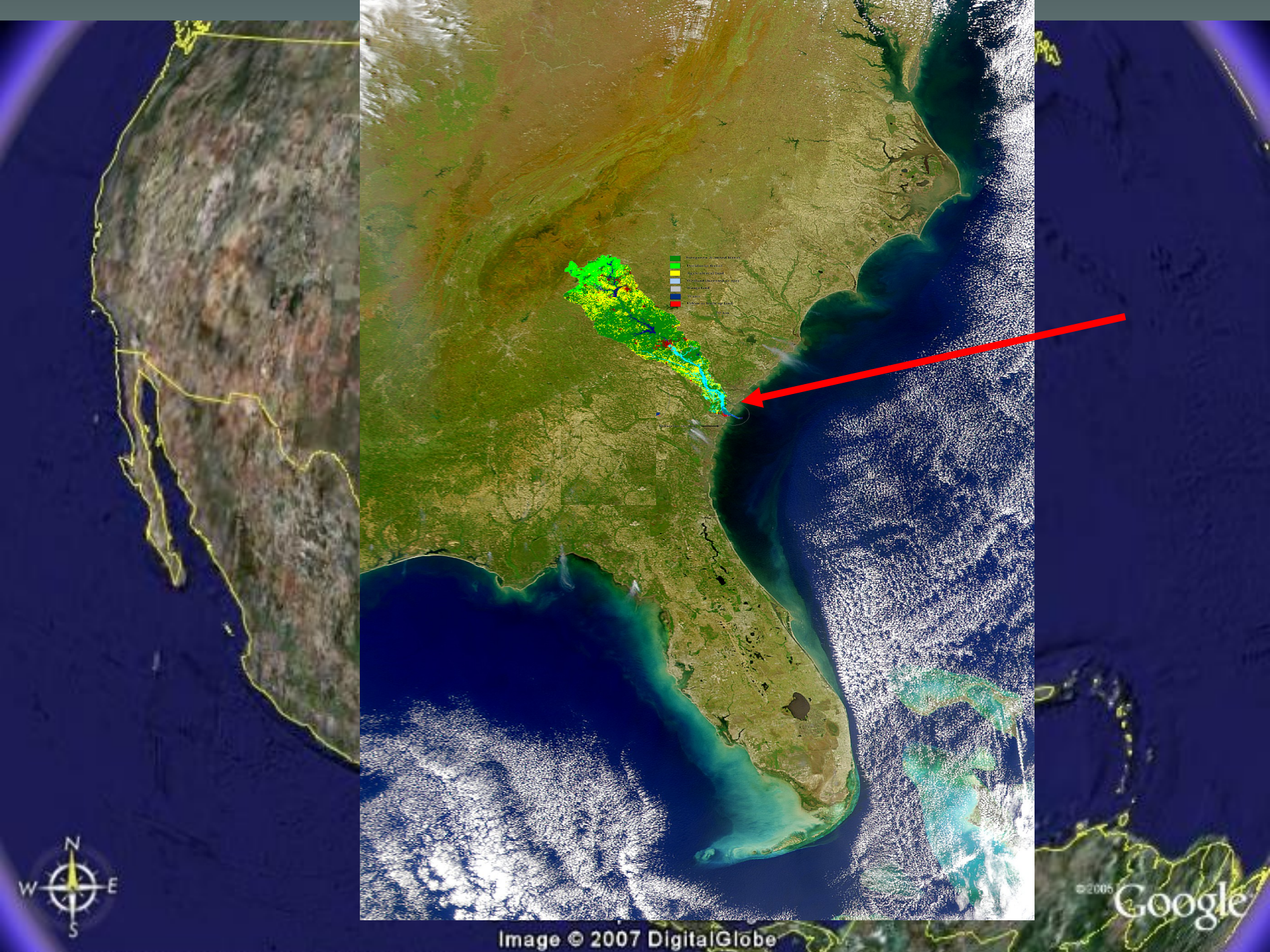


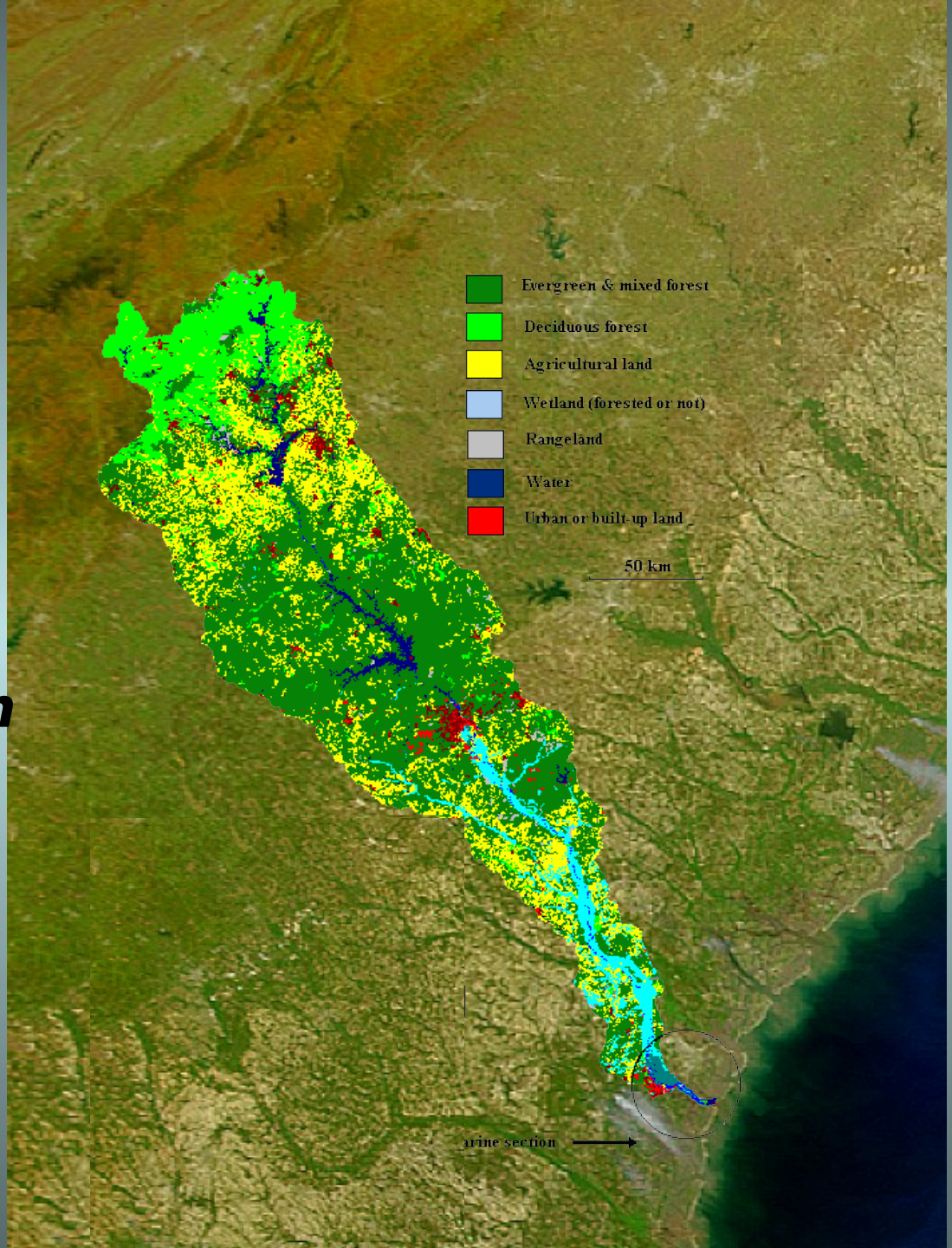
Adaptive Management of the Savannah River eco-flow restoration

Jason Ward, Hydrologist, Savannah District
Amanda Wrona Meadows, Ph.D., Director, Savannah River Initiative

The Nature Conservancy
Protecting nature. Preserving life.™

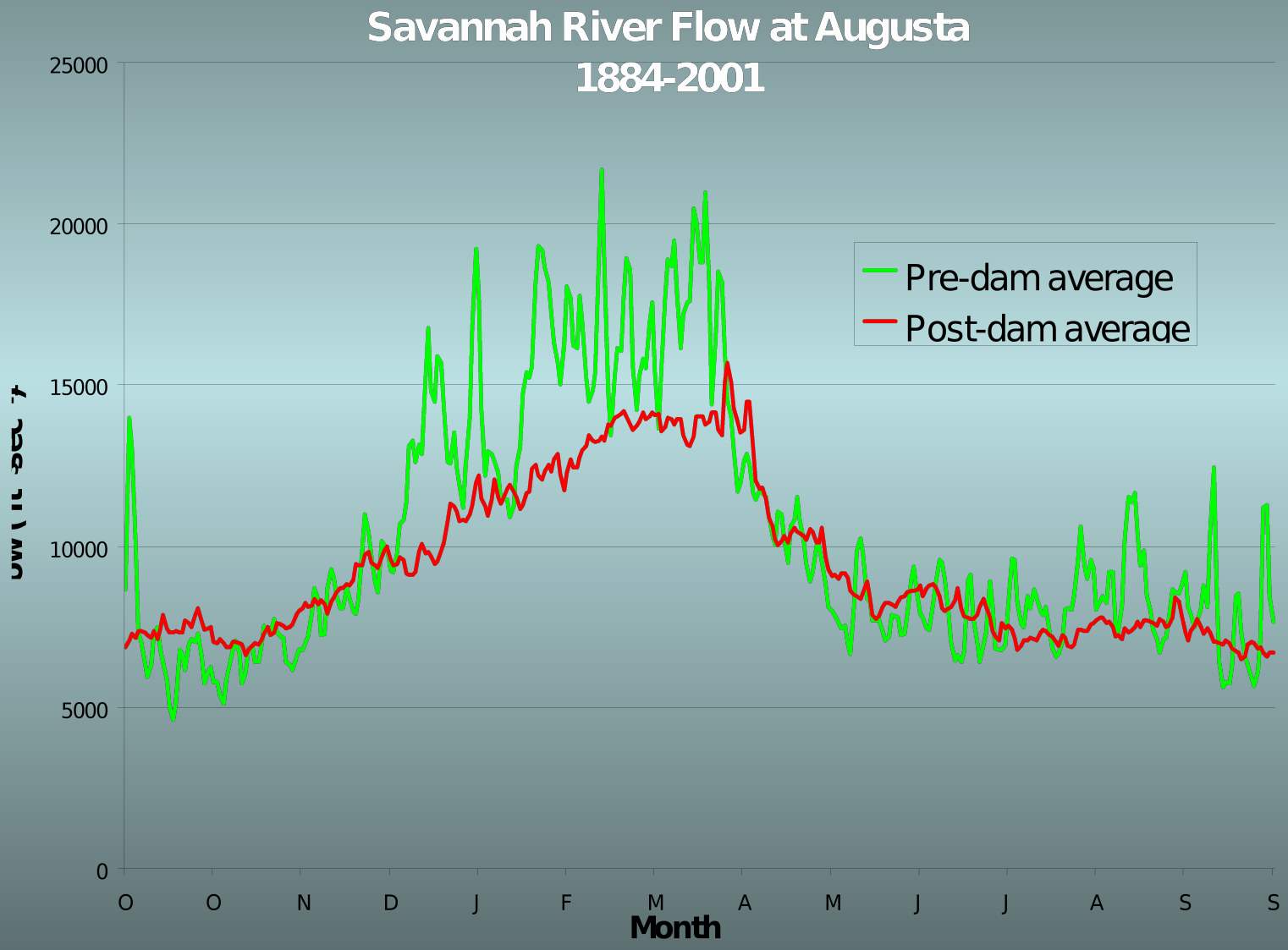

N
W
E
S
©2005 Google
Image © 2007 DigitalGlobe

Savannah River Basin 11,100 miles²



Restricted
Keep Back
400 Feet

Post-Dam Changes in the Savannah River Hydrograph

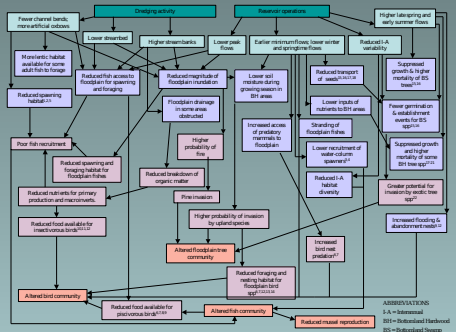


- Drinking Water supply
- Flood Control and Storm Protection
- Assimilative Capacity
- Water for Industry and Municipal Growth
- Commercial Fisheries
- Recreational Fisheries
- Hydropower
- Carbon Sequestration
- Tourism

Shad fisherman on the Savannah River

Ecological Flow Restoration *- the "Savannah Process"*

Develop Models



Workshops

Implementation

Measures

Management/Operations

Partners

ASU
Augusta State University

USGS
science for a changing world

The Nature Conservancy
Protecting nature. Preserving life.™

South Carolina Department of Natural Resources

Dept of Natural Resources
Wildlife Resources Division
Georgia

Savannah State University
1890
Savannah, Georgia

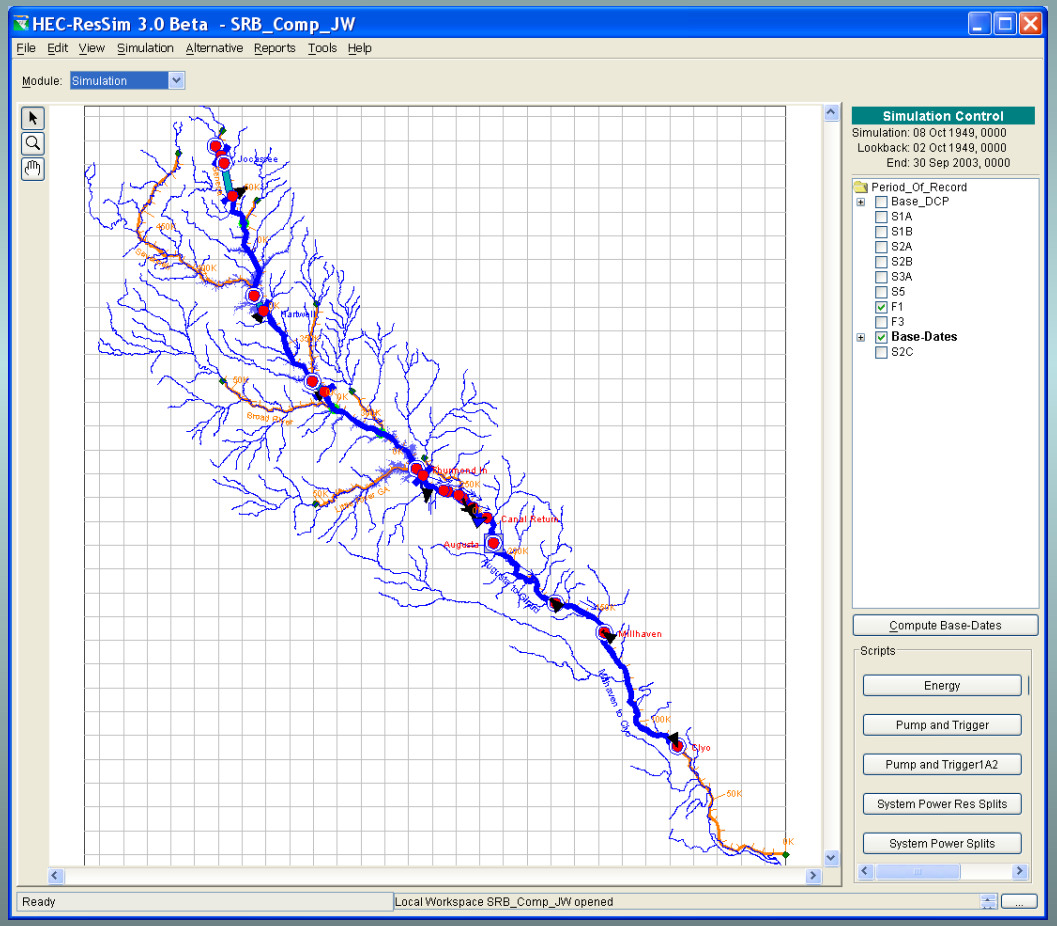
Southeastern Natural Sciences Academy
Phinizy Swamp Nature Park
Center for Urban River Research
Center for Ecological Restoration

The University of Georgia

USACE Water Management

- Operational Guidance Documents
  - Water Management Plan (Updated 1996)
  - Drought Contingency Plan (1989; Updated 2006)
- Savannah River Basin Comprehensive Study (WRDA 96)
  - Phase I – Drought Plan Update, Macro look at changes
  - Phase II – Detailed analysis of major operational changes

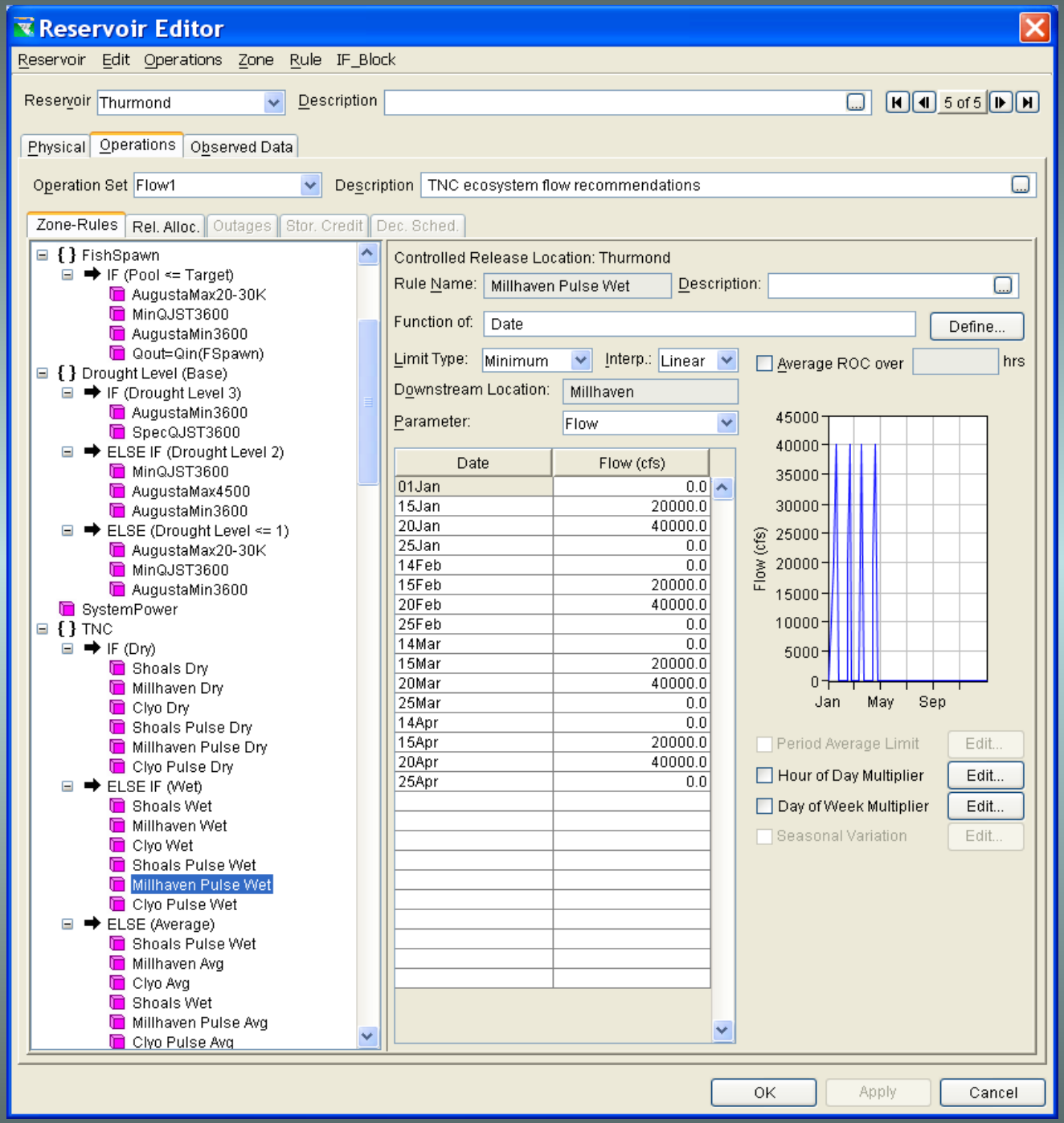
Modeling Tools
HEC-ResSim



Reservoir Operation Model

Savannah Basin Comp Study paid $450,000 for model improvements (if then else, state variables, system hydropower)

Helps evaluate tradeoffs with new operation criteria



Add Ecosystem Flows into Reservoir Operational Rules

Assess benefits and impacts

Adaptive Management of Ecosystem Pulse Flows

Spring 2004

- 1 (3-day) pulse flow windows of 16,000 cfs
- No Winter Pool drawdown

Spring 2005

- 2 (3-day) pulse flow windows of 18,000 cfs
- No Winter Pool drawdown

Spring 2006

- 1 (3-day) pulse flow window of 23,000 cfs
- Modified Winter Pool drawdown (2-ft)

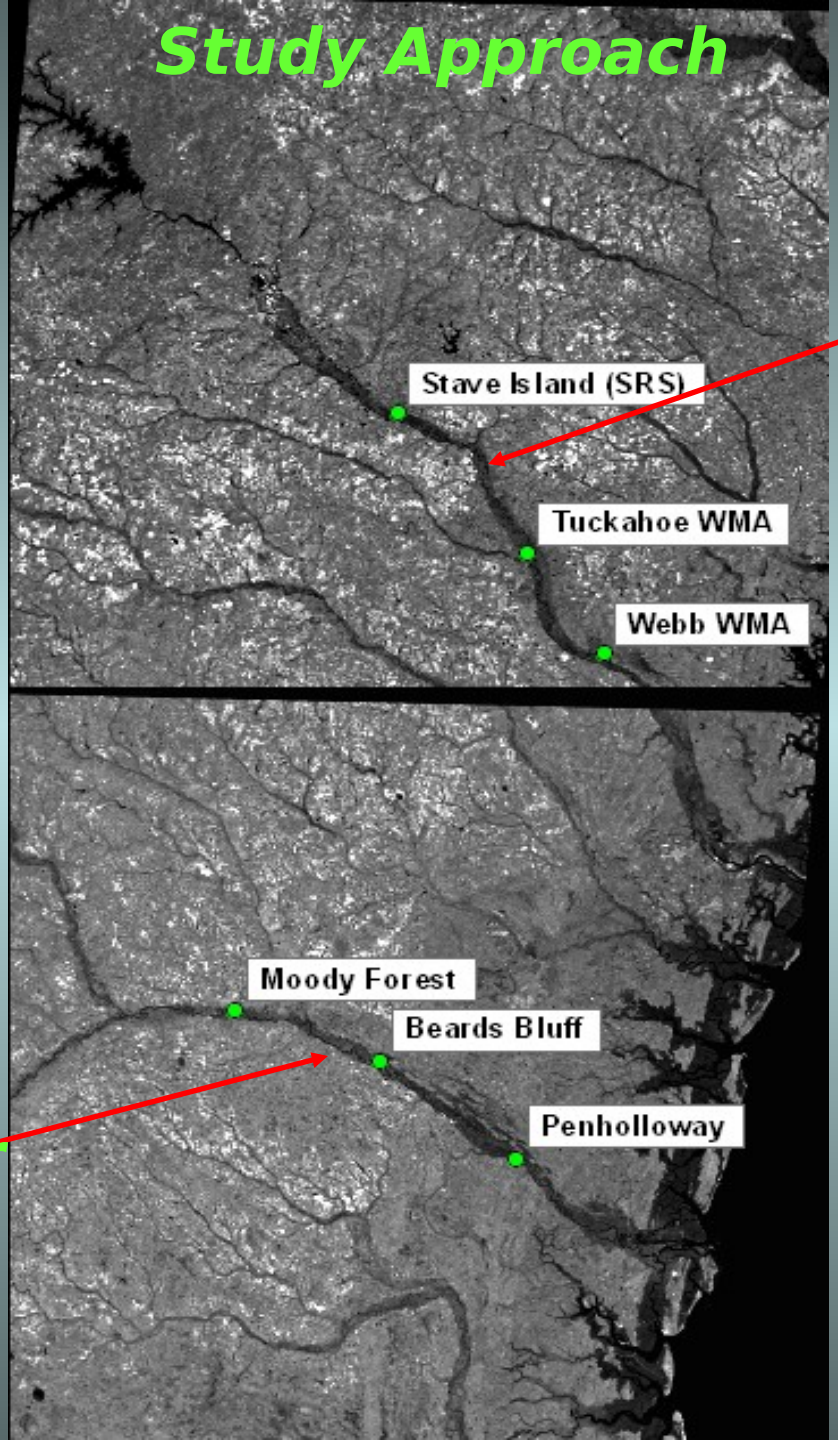
Spring 2007

- No reservoir pulse, 30,000 cfs natural flood event

October 2003 | March 2004 | Fall 2004 | Dec 2004 | March 2005 | March 2006 | Spring 2007

- Fish Passage
- Floodplain inundation
- Fish use of the flood plain
- Tree Recruitment
- Invertebrate Communities
- Shoals Spider Lily
- Relationship between salinity and dam discharge
- Water Quality

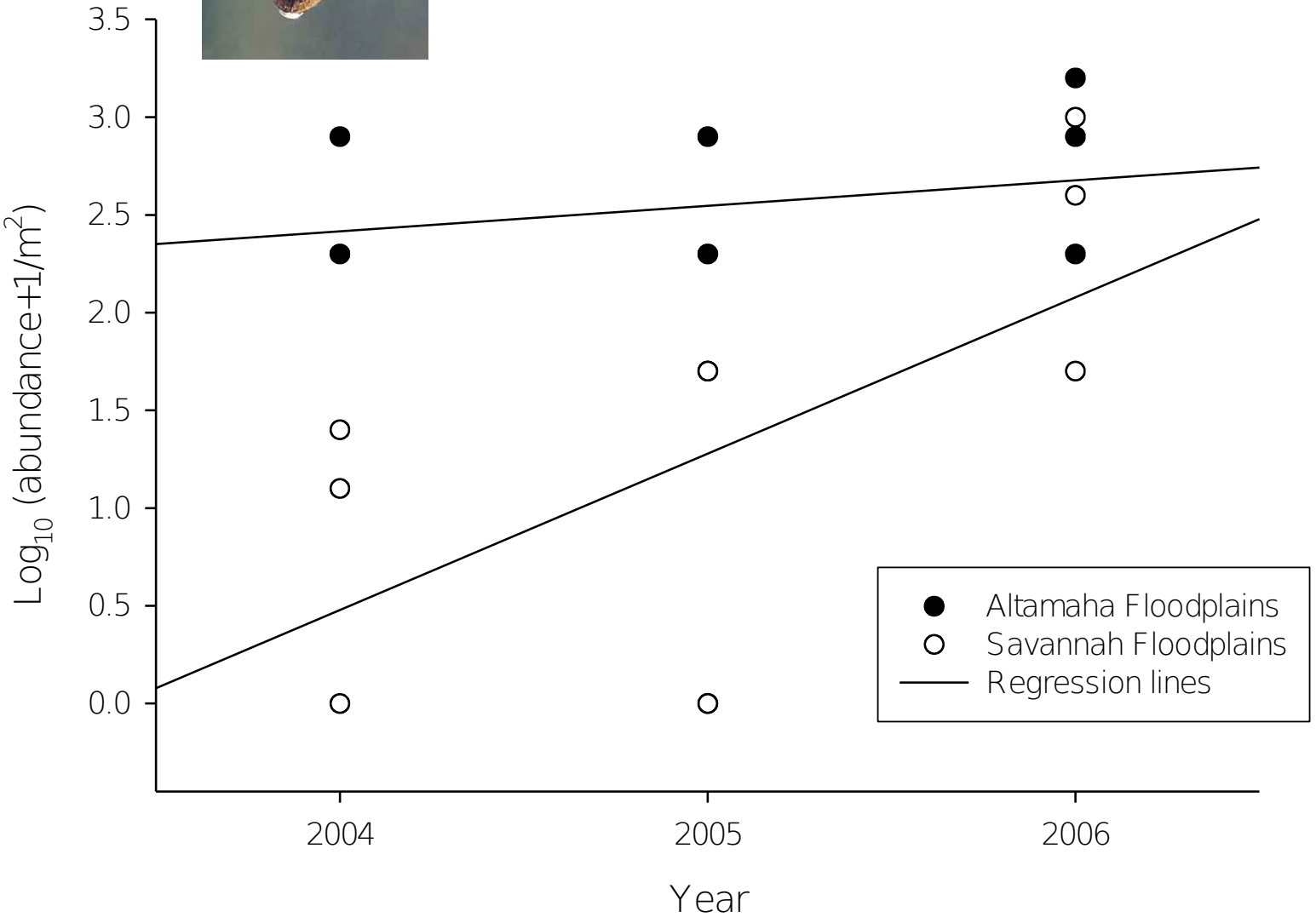
Study Approach



What are effects of ‘Spring Pulses’ on floodplain flooding?

- **>70% of the floodplain was inundated with flow above 27,000 cfs at Augusta**
- **Duration was less than 10 days**
- **Possible benefits of wetting, seed dispersal, fish access, and carbon export**

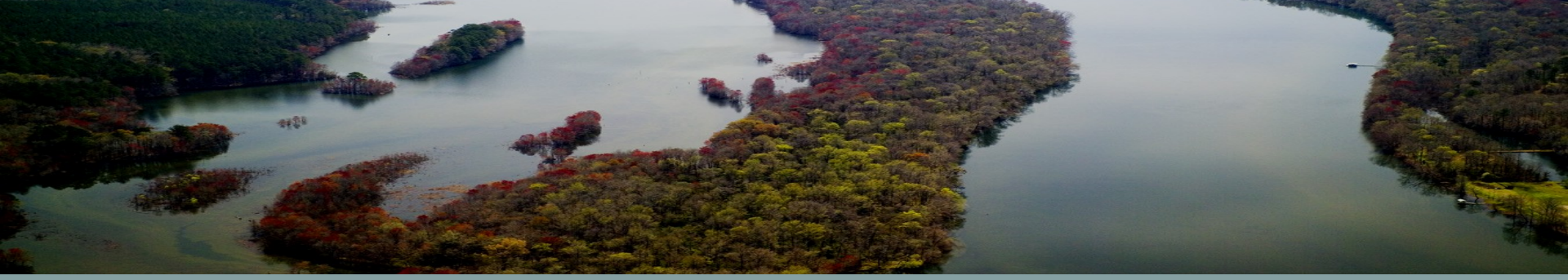
Dytiscidae beetles



Benefits Estuarine Habitat

- **The controlled release effects = 10 days**

- **Displacement of the interface downriver approximately 2**



Lessons Learned

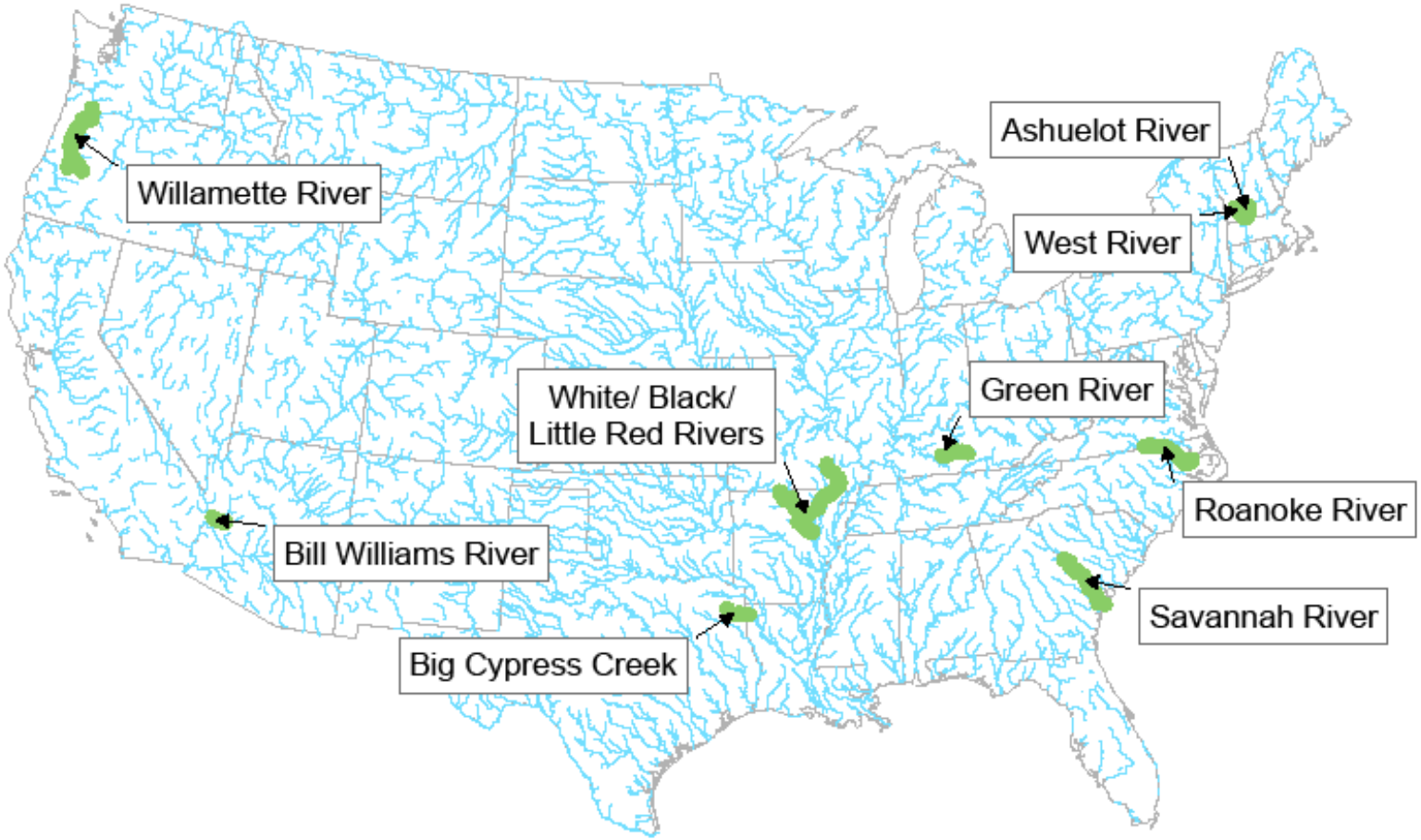
- Pulses did not facilitate passage of shortnose sturgeon at NSBLD
- Importance of a reference site
- Higher hanging fruit
- Partnerships
- Network to share and influence

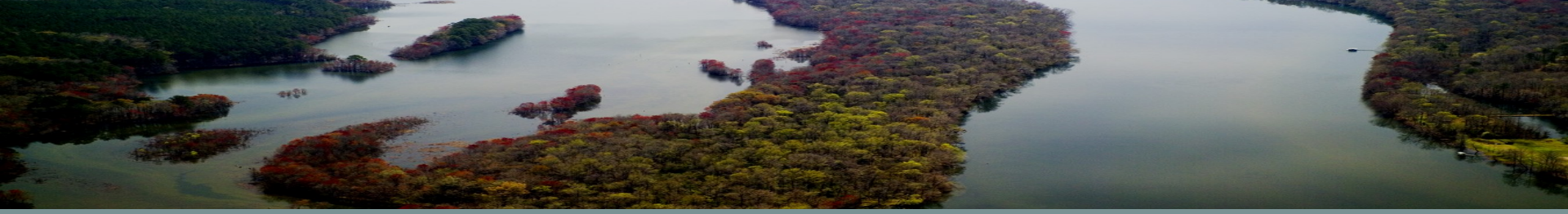
Sustainable Rivers Project

Current Sites

The Nature Conservancy

US Army Corps of Engineers





Multipurpose Reservoir Management
in the Savannah River Basin

The Nature Conservancy
Protecting nature. Preserving life.™